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# **CBDPP at the FEMP Cincinnati OH**

**Dr. Doran Christensen**

**Medical Director**

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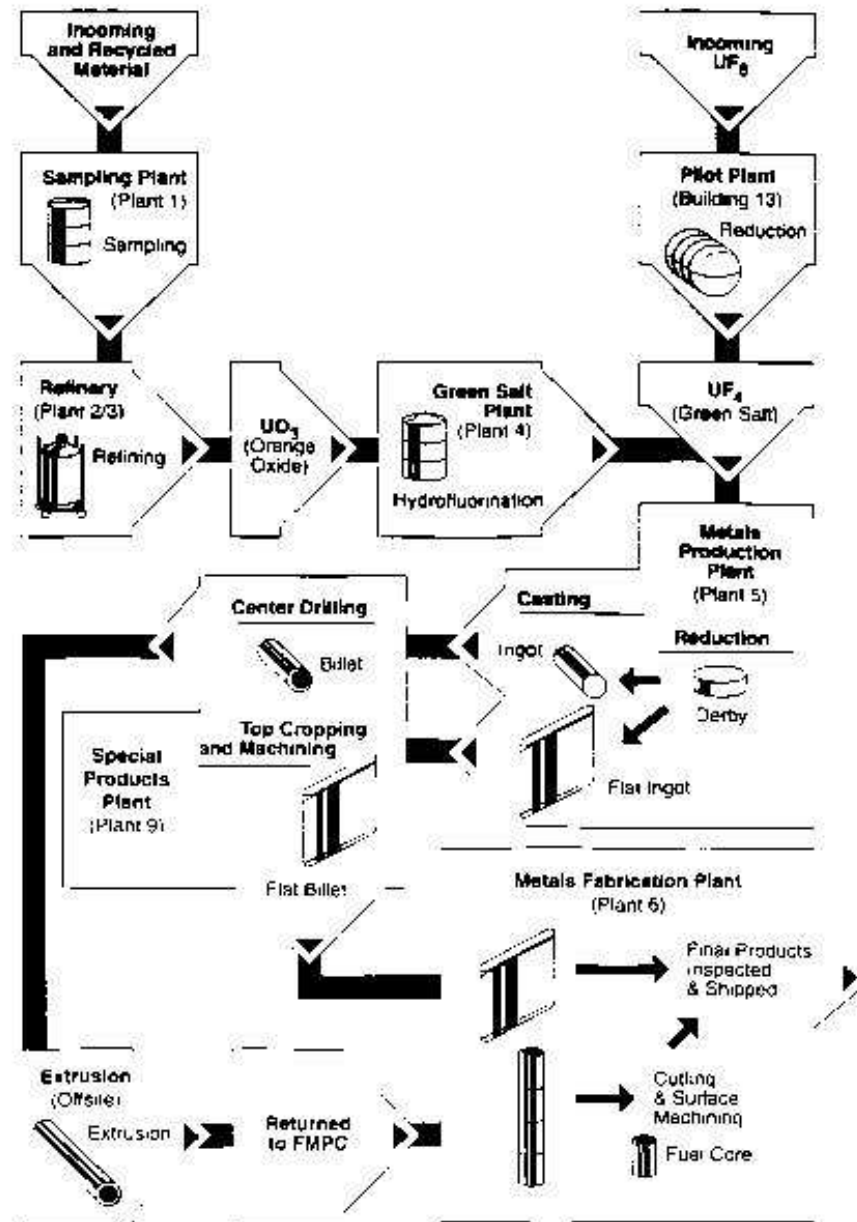




7476-266

# The Production Process

Figure 2: Former Site Production Process





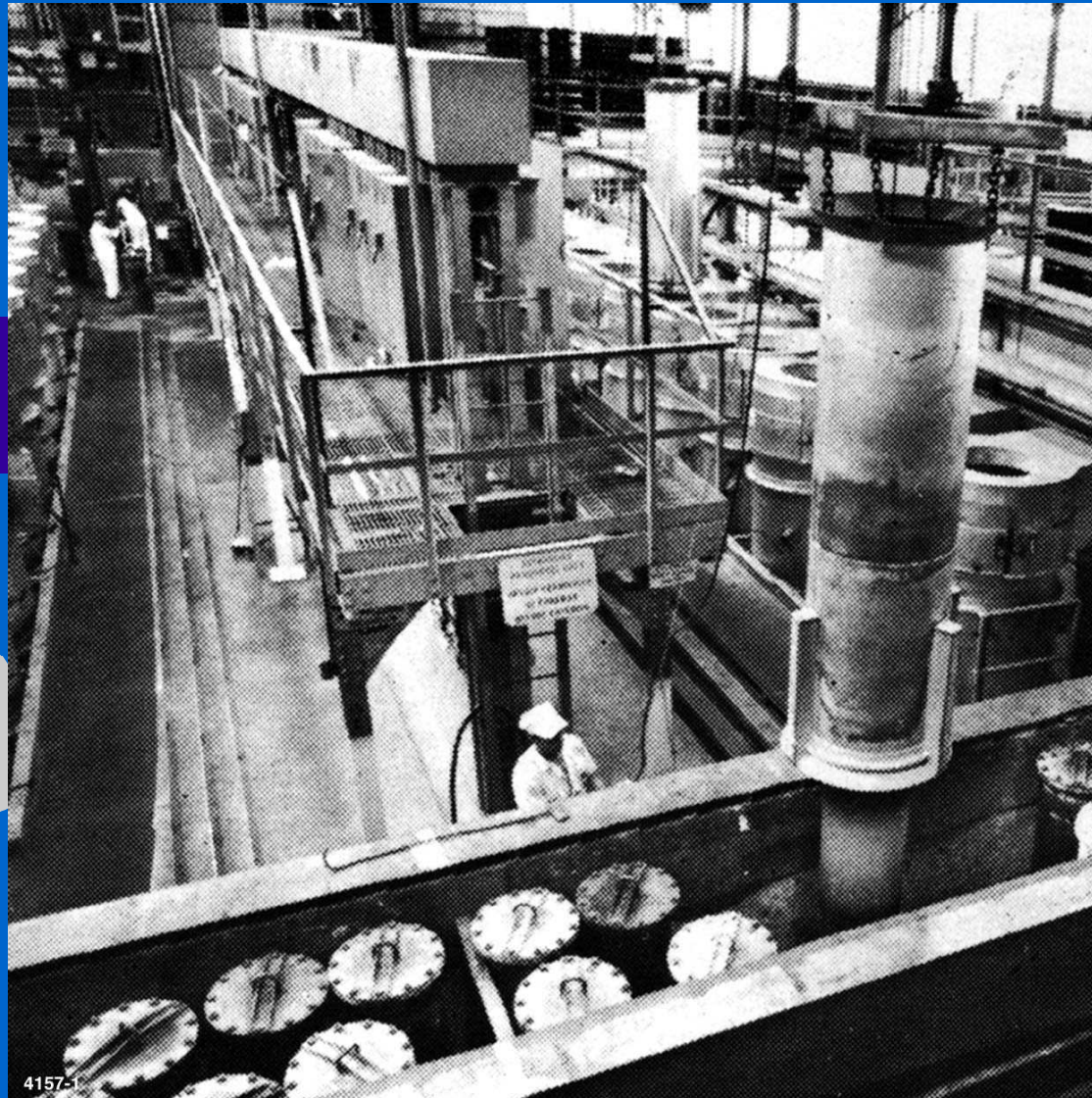
# The Legacy of Production

- Refine uranium to  $\text{UO}_3$  (orange oxide)
- Hydrofluorination of  $\text{UO}_3$  & reduction of  $\text{UF}_6$  to  $\text{UF}_4$  (green salt)
- Metal reduction to “derbies”
- Casting to ingots
- Center drilling of ingots to rod billets
- Top cropping & machining of flat ingots to flat billets
- Extrusion of rod billets offsite
- Cutting & surface machining to fuel cores
- Inspection & shipping





# The Legacy of Production The Smelter



Dr. Doran Christensen, Fluor Fernald, Inc., 3/7/01

# The Legacy of Production Crucibles with Green Salt



3694-6

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# The Legacy of Production “Derbies”



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# The Legacy of Production Inspecting Fuel Cores



5196-3

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# The Beryllium Legacy

## Baseline Inventory & Hazard Assessment

- FEMP never produced, manufactured, or machined beryllium products
- 50's-60's - small amounts of Be compounds (oxide & sulfate) used to coat graphite crucibles for uranium and thorium melts
- Discontinued in the 60's - material went to waste pits



## The Beryllium Legacy

### Baseline Inventory & Hazard Assessment

• **THEREFORE, THE ENTIRE FEMP IS NOT  
DESIGNATED AS A “BERYLLIUM SITE”...**

• **BUT...THE POTENTIAL EXISTS FOR**

**EXCAVATION OF SEVERAL WASTE PITS TO  
RESULT IN SOME AIRBORNE BERYLLIUM...**



• **THEREFORE, THE WASTE PIT PROJECT (WPRAP)  
IS DESIGNATED AS A “POTENTIAL BERYLLIUM  
EXPOSURE AREA”**



• • • • •

- # 60's



# Worker Assignment

## Principles of worker protection

### 1.) Engineering controls

### 2.) Administrative controls

### 3.) Controls with PPE





# Worker Assignment

## 3.) Control with Personal Protective Equipment (PPE)

Hazard of greatest potential in excavation is radioactive materials, therefore, full anti-contamination clothing + respirators is required.



THEREFORE, THERE IS ADEQUATE HUMAN PROTECTION FROM AIRBORNE Be SHOULD IT OCCUR



# Worker Assignment

1.) Engineering controls - Waste material in waste pits is sludge with little potential for becoming airborne until

–Drying in huge rotating heater bins to remove water

–Conveyor movement to Rail Load-out Building

–Loading into rail-cars that are capped after loading

**AIRBORNE CONTAMINATION IS MINIMIZED BY**

**DUST SUPPRESSION WITH WATER**





# Worker Assignment

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- 2.) Administrative controls - reduce total individual exposure AND reduce total population exposure
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–Initial worker assignment to waste pit remediation limited to small cadre of workers with sufficient numbers to cover backfill for vacations, holidays, *etc.*

–Those workers with previous history of potential exposure to Be required to undergo baseline surveillance evaluations prior to start work AND

–pending bulk sample analysis and BZ / GA sample analysis for beryllium





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GA &  
m³, us

# Worker Medical Surveillance & Biologic Monitoring

1.) Workers *with a history of potential past exposure* at the FEMP or elsewhere undergo the recommended pre-beryllium work baseline medical evaluation including CXR, LPT, *etc. prior to work* in the WPRAP.

2.) Workers *without a past history of exposure* undergo the same but are *allowed to work* in the WPRAP prior to return of LPT results.

3.) Workers with positive results are provided the opportunity for an *alternative to multiple physician review* with a specialist in occupational pulmonary diseases and are *not permitted to work* in the WPRAP. Medical removal protection benefits are provided.

# Summary

- 1.) The FEMP has not been designated as a beryllium site;
- 2.) There are no “regulated areas” at the FEMP;
- 3.) The Waste Pits have been administratively designated as “potential” beryllium hazard areas or regulated areas;
- 4.) FEMP workers’ medical surveillance / biologic monitoring process is managed exactly as if the Waste Pits were, in fact, a beryllium “regulated area”;
- 5.) FEMP workers in the Waste Pits are managed as “Beryllium Associated Workers” with medical surveillance baseline and reevaluation at 3 years;
- 6.) Should significant levels of beryllium be encountered, those workers will be managed as “Beryllium Workers” with medical surveillance baseline and reevaluation yearly.